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CONSCIOUSNESS AND THE VOICES OF THE MIND

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Starting out as a traditional comparative psychobiologist, his approach was to chart the evolution of consciousness by studying learning and brain function in various species, from the protozoa to worms, reptiles, and cats. Finding this approach unsatisfactory, he changed course and has more recently examined consciousness through historical analysis, introspection, and the study of language and metaphor.

Dr. Jaynes has published widely, his earlier work being on topics such as imprinting in birds and the neural mediation of mating behavior in cats. His more recent work culminated in 1976 in his book *The Origin of Consciousness in the Breakdown of the Bicameral Mind*. Elaborating upon this book are numerous more recent articles published in a diversity of journals such as *The History of Ideas, Art World,* and *The Behavioral and Brain Sciences*.

Few problems have had as interesting an intellectual trajectory through history as that of the mind and its place in nature. Before 1859, the year that Darwin and Wallace independently proposed natural selection as the basis of evolution, this issue was known as the mind/body problem with its various and sometimes ponderous solutions. But after that pivotal date, it came to be known as the problem of consciousness and its origin in evolution.

Now the first thing I wish to stress this afternoon is this problem. It is easy for the average layman to understand. But paradoxically, for philosophers, psychologists, and neurophysiologists, who have been so used to a different kind of thinking, it is a difficult thing. What we have to explain is the contrast, so obvious to a child, between all the inner covert world of imaginings and memories and thoughts and the external public world around us. The theory of evolution beautifully explains the anatomy of species, but *how* out of mere matter, mere molecules, mutations, anatomies, can you get this rich inner experience that is always accompanying us during the day and in our dreams at night? That is the problem we will consider in this symposium.

Previous Solutions

Previous solutions have been illusory. One of the most difficult but historically interesting (associated with philosophers such as Perry, 1912, or Whitehead, 1925) was a vague

analogy that came to be called neo-realism. It seemed to be saying that because interacting matter could be reduced to mathematical relationships, in some ways like our own perceptions and interpersonal relationships, therefore consciousness originates in matter itself. Unfortunately, this much too abstract notion is having a bit of a renaissance today in a different way with some physicists because of some of the astonishing results in quantum physics (e.g., Wigner, 1972).

Another more popular solution was due to Darwin himself. In the last paragraph of *The Origin of Species* (Darwin, 1859), he implies that God created mind and body in the first primitive organisms and then both evolved in parallel together. But this sunk the problem in metaphysics, and it was soon realized that there should be some criterion of consciousness. It seemed obvious in the empiricist climate of the time that this was learning. So the question became: when did learning originate in evolution? Many people don't realize that the reason so many psychologists were studying animal learning, like maze-learning in rats, in the first two decades of this century, was to study animal consciousness on a primitive level and so trace out its evolution. As Dr. Witelson pointed out in her thoughtful introduction, this was indeed the focus of my early work for many years, but which I now see has nothing to do with consciousness. This error, I think, comes from John Locke and empiricism: The mind is a space where we have free ideas somehow floating around and that is consciousness. And when we perceive things in contiguity or contrast or some of the other so-called laws of association, their corresponding ideas stick together. Therefore, if you can show learning in an animal, you are showing the association of ideas which means consciousness. This is muddy thinking. I will be returning to this error in a moment.

Then, of course, there were other solutions—the helpless spectator theory of Huxley (1896), that consciousness just watched behavior and could do nothing. But if that is true, why is it there at all? And so there followed emergent evolution, which was meant to save us from such a pessimistic view. It was most fully developed by Lloyd Morgan (1923), although the idea goes back to the 19th century. A simple example is water: If you take hydrogen and oxygen you can't derive the wetness or water from either. Wetness is an emergent. Similarly, when in evolution there is a certain amount of brain tissue, then suddenly you get consciousness. Consciousness is an emergent, underived from anything before. It is also having a renaissance in the writings of some neuroscientists today. On analysis, it generates no hypotheses and tells us nothing about any processes involved. Emergent evolution is a label that bandages our ignorance.

What I shall now present is a different kind of solution and one that has surprised me in the wealth of specific and testable hypotheses which it generates, and surprised me in the directions into which my work has been forced. But first we must face squarely the question of what is consciousness. And as a preface to that, I will first outline a few things that consciousness is not.

What Consciousness Is Not

First, consciousness is not all of mentality. You know perfectly well. There are so many things that the nervous system does automatically for us. All the variety of perceptual constancies—for example, size, brightness, color, shape, which our nervous systems preserve under widely varying environmental changes of light, distance, angle of regard, or even our own moving about in which objects retain their same position, called location constancy—all done without any help from introspective consciousness.

So with another large class of activities that can be called *preoptive*, such as how we sit, walk, move. All these are done without

consciousness, unless we decide to be conscious of them—the preoptive nature of consciousness. Even in speaking, the role of consciousness is more interpolative than any constant companion to my words. I am not now consciously entering my lexical storehouse and consciously selecting items to string on these syntactical structures. Instead, I have what can best be described as intentions of certain meanings, what I call structions, and then linguistic habit patterns which take over without further input from my consciousness. Similarly, in hearing someone speak, what are you, the listeners, conscious of? If it were flow of phonemes or even the next level up of morphemes or even words, you would not be understanding what I am intending.

Consciousness is sometimes confused even with simple sense perception. Historically, we inferred and abstracted ideas of sense perception from a realization of our sense organs, and then, because of prior assumptions about mind and matter or soul and body, we believed these processes to be due to consciousness—which they are not. If any of you still think that consciousness is a necessary part of sense perception, then I think you are forced to follow a path to a *reductio ad absurdum*: you would then have to say that since all animals have sense perception, all are conscious, and so on back through the evolutionary tree even to one-celled protozoa because they react to external stimuli, or one-celled plants like the alga chlamydomonas with its visual system analogous to ours, and thence to even amoeboid white cells of the blood since they sense bacteria and devour them. They too would be conscious. And to say that there are ten thousand conscious beings per cubic millimeter of blood whirling around in the roller-coaster of the vascular system in each of us here this afternoon is a position few would wish to defend.

That consciousness is in everything we do is an illusion. Suppose you asked a flashlight in a completely dark room to turn itself on and to look around and see if there was any light—the flashlight as it looked around would of course see light everywhere and come to the conclusion that the room was brilliantly lit when in fact it was mostly just the opposite. So with consciousness. We have an illusion that it is all mentality. If you look back into the struggles with this problem in the 19th century and early 20th century, this is indeed the error that trapped people into so much of the difficulty, and still does.

Second, consciousness does not copy experience. This further error about consciousness stems from the beginning of empiricism when Locke (1690) spoke of the mind's "white paper, void of all characters, without any ideas" (Essay II, 1.2) on which experience is copied. Had the camera been around at the time, I suggest Locke would have used it instead of blank paper as his foundational metaphor. In experience, we take successive pictures of the world, immerse them in the developer of reflection, and watch concepts, memories, and all our mental furnishings come into existence.

But that consciousness does not copy experience can be shown very easily: (a) by examining the absence of memories that we should have if consciousness did copy experience, such as knowing what letters go with what numbers on telephones—although we have stared at the matter thousands of times, most of us cannot say—and countless other examples; or (b) by examining the memories we have and noting that they are not structured the way we experience them, such as thinking of the last time you were swimming—to take an example from Donald Hebb (1961). Most people, instead of thinking of the complicated visual, thermal, proprioceptive, respiratory experience as it actually was, tend to see themselves swimming from another point of view—a bird's eye view perhaps—something of course they have never experienced at all. The conscious mem-

ory does not copy experience but reconstructs it as a must-have-been. This view is similar to some of the recent constructivist theories of memory.

Third, consciousness is not necessary for learning—which I referred to a moment ago as the mistake I labored under for so long. If we look at the most primitive kinds of learning, such as Pavlovian conditioning, it occurs in preparations such as the hind leg of a beheaded cockroach for which no one would think that consciousness is plausible. And in humans not only does consciousness not assist in acquisition of conditioned responses, it destroys conditioning once the human being is conscious of the contingences (Razran, 1971).

Learning motor skills seems to happen without much consciousness as well. This was studied extensively in the 1920s in relation to telegraphy, stenography, and the like, occupations which were very important back then. The learning seemed to the subjects to be "organic"—that was one of their words. They were surprised that consciousness did not seem to enter into this learning the way they expected it might.

A more complicated kind of learning is instrumental learning, or operant conditioning, or we would call it learning solutions to problems. This is the old psychological problem called learning without awareness. Psychologists will remember the Greenspoon effect (Greenspoon, 1955) and some of the studies on the instrumental learning of little muscular movements without consciousness (Hefferline, Keenan, & Harford, 1959), and many others. It is more problematical than I can go into here, but I think that we can show that instrumental learning can occur without consciousness.

This is not to say that consciousness does not play a role in these different types of human learning. It does, as in decisions as to what to learn, or making rules of how to learn better, or consciously verbalizing aspects of a task. But this is not the learning itself. And my point is that consciousness is not necessary for learning to occur.

One could here bring up the well-known phenomenon of the automatization of habit; for when this happens to us, it seems that the task has required consciousness at the beginning; but as the habit is perfected, consciousness eases away and the task is performed effortlessly. This same smoothing out and increased rapidity of performance of a habit with practice is universal among all animals that learn. Generally, in this ubiquitous phenomenon, it is not necessarily or basically the lapsing of consciousness with improved performance so much as the lapsing of forced attention to components of the task. And attention, specifically external attention, which is the focusing of sense perception, is not necessarily conscious. Take two coins in either hand, and toss them across each other until you learn to catch with the opposite hand. This is a task that will take somewhere between 15 and 20 trials to learn. And if you wish to try this this evening, and monitor your consciousness while you are doing so, you will find that consciousness has little to do with the learning that seems to go on mechanically. You might be conscious of something about your clumsiness, or the silliness of what you are doing as you keep picking the coins up from the floor, until, at the point of success, your consciousness is somewhat surprised and even proud of your superior dexterity. It is the attention which has changed. Automatization is a diminution of attention, not of consciousness.

The fourth thing for which consciousness is not necessary, and it may seem rather paradoxical, is thinking or reasoning. Here we are getting into perhaps the major problem in this area: the definition of our terms, particularly terms such as thinking and reasoning. If we take the simplest definition of thinking, I think we can show indeed that consciousness is not necessary for it. This concerns one of

the forgotten experiments of psychology. It is indeed so simple to us today that it seems silly. And yet to me it is as important in the history of psychology as the very complicated Michelson-Morley experiment is in the history of physics (Swenson, 1972). As the latter showed that the aether did not exist, setting the stage for relativity theory, so the experiment I am about to describe showed that thinking is not conscious, setting the stage for the kind of theorizing I am describing here.

The experiment I refer to was first done in 1901 by Karl Marbe, a graduate student at Würzberg (Marbe, 1901) back in a scientific world when consciousness was being intensively studied for the first time. Using his professors as subjects, each of whom had had extensive experience of experiments in introspection, he asked them to make a simple judgment between two identical-looking weights as to which was the heavier. Against the background of the experimental psychology of the time, the result was astonishing. There was no conscious content for the actual judgment itself, although such a judgment was embedded in the consciousness of the problem, its materials, and technique.

So began what came to be called the Würzburg School of Imageless Thought, which led through experiments by Ach, Watt, Kulpe, and others (see discussions by Boring, 1929, Humphrey, 1951, or Murray, 1983) to concepts such as set, *aufgabe*, and determining tendency—which I have renamed *structions*. Structions are like instructions given to the nervous system, that, when presented with the materials to work on, result in the answer automatically without any conscious thinking or reasoning. And this phenomenon applies to most of our activities, from such simplicities as judging weights to solving problems to scientific and philosophical activity. Consciousness studies a problem and prepares it as a struction, a process which may result in a sudden appearance of the solution as if out of nowhere. During World War II, British physicists used to say that they no longer made their discoveries in the laboratory; they had their three B's where their discoveries were made—the bath, the bed, and the bus. And, as I have mentioned earlier, this process on a smaller scale is going on in me at present as I am speaking: my words are as if chosen for me by my nervous system after giving it the struction of my intended meaning.

Finally, in this list of misconceptions about consciousness, a word about its location. Most people, with possibly the present company excepted, who have thought long about the problem and so placed it "out there" in the intellectual domain, tend to think of their consciousness, much as Descartes, Locke, and Hume did, as a space usually located inside their heads. Particularly when we made eye-to-eye contact, we tend to—in a subliminal way—infer such space in others. There is of course no such space whatever. The space of consciousness, which I shall hereafter call *mind-space*, is a functional space that has no location except as we assign one to it. To think of our consciousness as inside our heads, as reflected in and learned from our works like introspection or internalization, is a very natural but arbitrary thing to do. I certainly do not mean to say that consciousness is separate from the brain; by the assumptions of natural science, it is not. But we use our brains in riding bicycles, and yet no one considers that the location of bicycle riding is inside our heads. The phenomenal location of consciousness is arbitrary.

To sum up so far, we have shown that consciousness is not all mentality, not necessary for sensation or perception, that it is not a copy of experience, nor necessary for learning, nor even necessary for thinking and reasoning, and has only an arbitrary and functional location. As a prelude to what I am to say later, I wish you to consider that there could have been at one time human beings who did most of the things we do—speak, understand, perceive, solve problems—but

who were without consciousness. I think this a very important possibility.

So far this is almost going back to a radical behaviorist position. But what then is consciousness, since I regard it as an irreducible fact that my introspections, retrospections, and imaginations do indeed exist? My procedure here will be to outline in a somewhat terse fashion a theory of consciousness and then to explain it in various ways.

What Consciousness Is

Subjective conscious mind is an analog of what we call the real world. It is built up with a vocabulary or lexical field whose terms are all metaphors or analogs of behavior in the physical world. Its reality is of the same order as mathematics. It allows us to short-cut behavioral processes and arrive at more adequate decisions. Like mathematics, it is an operator rather than a thing or a repository. And it is intimately bound with volition and decision.

Consider the language we use to describe conscious processes. The most prominent group of words used to describe mental events are visual. We ‘see’ solutions to problems, the best of which may be ‘brilliant’ or ‘clear’ or possibly ‘dull,’ ‘fuzzy,’ ‘obscure.’ These words are all metaphors, and the mind-space to which they apply is generated by metaphors of actual space. In that space we can ‘approach’ a problem, perhaps from some ‘viewpoint,’ ‘grapple’ with its difficulties. Every word we use to refer to mental events is a metaphor or analog of something in the behavioral world. And the adjectives that we use to describe physical behavior in real space are analogically taken over to describe mental behavior in mind-space. We speak of the conscious mind as being ‘quick’ or ‘slow,’ or of somebody being ‘nimble-witted’ or ‘strong-minded’ or ‘weak-minded’ or ‘broad-minded’ or ‘deep’ or ‘open’ or ‘narrow-minded.’ And so like a real space, something can be at the “back” of our mind, or in the ‘inner recesses’ or ‘beyond’ our minds. But, you will remind me, metaphor is a mere comparison and cannot make new entities like consciousness. A proper analysis of metaphor shows quite the opposite. In every metaphor there are at least two terms, the thing we are trying to express in words, the *metaphrand*, and the term produced by a struction to do so, the *metaphier*. These are similar to what Richards (1936) called the tenor and the vehicle, terms more suitable to poetry than to psychological analysis. I have chosen metaphrand and metaphier instead to have more of the connotation of an operator by echoing the arithmetic terms of multiplicand and multiplier. If I say the ship plows the sea, the metaphrand is the way the bow goes through the water and the metaphier is a plow.

As a more relevant example, suppose a person, back in the time at the formation of our mental vocabulary, has been trying to solve some problem or to learn how to perform some task. To express his success, he might suddenly exclaim (in his own language), aha! I ‘see’ the solution. ‘See’ is the metaphier, drawn from the physical behavior from the physical world, that is applied to this otherwise inexpressible mental occurrence, the metaphrand. But metaphiers usually have associations called *paraphiers* that project back into the metaphrand as what are called *paraphrands* and, indeed, create new entities. The word ‘see’ has associations of seeing in the physical world and therefore of space, and this space then becomes a paraphrand as it is united with this inferred mental event called the metaphrand.

$$\begin{array}{ccc} \text{metaphrand} & \rightarrow & \text{metaphier} \\ \| & & \downarrow \\ \text{paraphrand} & \rightarrow & \text{paraphier} \end{array}$$

In this way the spatial quality of the world around us is being driven into the psychological fact of solving a problem (which as I indicated needs no consciousness). And it is

this associated spatial quality that, as a result of the language used to describe such psychological events, becomes, with constant repetition, this spatial quality of our consciousness or mind-space. This mind-space I regard as the primary feature of consciousness. It is the space which you preoptively are introspecting on at this very moment.

But who does the 'seeing?' Who does the introspecting? Here we introduce analogy, which differs from metaphor in that the similarity is between relationships rather than between things or actions. As the body with its sense organs (referred to as I) is to physical seeing, so there develops automatically an analog 'I' to relate to this mental kind of 'seeing' in mind-space. The analog 'I' is the second most important feature of consciousness. It is not to be confused with the self, which is an object of consciousness in later development. The analog 'I' is contentless, related I think to Kant's (1781) transcendental ego. As the bodily I can move about in its environment looking at this or that, so the analog 'I' learns to 'move about' in mind-space concentrating on one thing or another. If you 'saw' yourself swimming in our earlier example, it was your analog 'I' that was doing the 'seeing.'

A third feature of consciousness is *narratization*, the analogic simulation of actual behavior. It is an obvious aspect of consciousness, which seems to have escaped previous synchronic discussions of consciousness. Consciousness is constantly fitting things into a story, putting a before and an after around any event. This feature is an analog of our physical selves moving about through a physical world with its spatial successiveness, which becomes the successiveness of time in mind-space. And this results in the conscious conception of time, which is a *spatialized time* in which we locate events and indeed our lives. It is impossible to be conscious of time in any other way than as a space.

There are other features of consciousness which I shall simply mention: *concentration*, the 'inner' analog of external perceptual attention; *suppression*, by which we stop being conscious of annoying thoughts, the analog of turning away from annoyances in the physical world; *excerption*, the analog of how we sense only one aspect of a thing at a time; and *consilience*, the analog of perceptual assimilation; and others. In no way is my list meant to be exhaustive. The essential rule here is that no operation goes on in consciousness that was not in behavior first. All of these are learned analogs of external behavior.

Psychologists are sometimes justly accused of the habit of reinventing the wheel and making it square and then calling it a first approximation. I would demur from agreement that this is true in the development I have just outlined, but I would indeed like to call it a first approximation. Consciousness is not a simple matter and it should not be spoken of as if it were. Nor have I mentioned the different modes of narratization in consciousness such as verbal, perceptual, bodily, or musical, all of which seem quite distinct with properties of their own. But it is enough, I think, to allow us to go back to the evolutionary problem as I stated it in the beginning and which has caused so much trouble in biology, psychology, and philosophy.

When did all this 'inner' world begin? Here we arrive at the most important watershed in our discussion. Saying that consciousness is developed out of language means that everybody from Darwin on, including myself in earlier years, was wrong in trying to trace out the origin of consciousness biologically or neurophysiologically. It means we have to look at human history after language has evolved and ask when in history did an analog 'I' narratizing in a mind-space begin.

When did language evolve? Elsewhere (Jaynes, 1976a) I have outlined ideas of how language could have evolved from call modification, which has been called the 'Wahee,

Wahoo model' and is at present in competition with several others (Maxwell, 1984). But such theorizing points to the late Pleistocene or Neanderthal era on several grounds: (1) such a period coincides with an evolutionary pressure over the last glacial period for verbal communication in the hunting of large animals; (2) it coincides with the astonishing development of the particular areas of the brain involved in language; and (3), what is unique in this theory, it corresponds to the archeological record of an explosion of tool artifacts, for we know that language is not just communication, but also acts like an organ of perception, directing attention and holding attention on a particular object or task, making advanced tool-making possible. This dating means that language is no older than 50,000 years, which means that consciousness developed sometime between that date and the present.

It is fortunate for this problem that by 3000 B.C., human beings have learned the remarkable ability of writing. It is therefore obvious that our first step should be to look at the early writings of mankind to see if there is evidence of an analog 'I' narratizing in a mind-space. The first writing is in hieroglyphics and cuneiform, both very difficult to translate, especially when they refer to anything psychological. And therefore we should go to a language with which we have some continuity, and that is of course Greek. The earliest Greek text of sufficient size to test our question is the Iliad. Are the characters in the Iliad narratizing with an analog 'I' in a mind-space and making decisions in this way?

The Bicameral Mind

First, let me make a few generalizations about the Iliad. To me and to roughly half of classicists, it is oral poetry, originally spoken and composed at the same time by a long succession of *aoidoi* or bards. As such, it contains many incongruities. Even after it was written down in about 800 B.C., perhaps by someone named Homer, it had many interpolations added to it even centuries later. So there are many exceptions to what I am about to say, such as the long speech of Nestor in Book XI for example, or the rhetorical reply of Achilles to Odysseus in Book IX.

But if you take the generally accepted oldest parts of the Iliad and ask, "Is there evidence of consciousness?" the answer, I think, is no. People are not sitting down and making decisions. No one is. No one is introspecting. No one is even reminiscing. It is a very different kind of world.

Then, who makes the decisions? Whenever a significant choice is to be made, a voice comes in telling people what to do. These voices are always and immediately obeyed. These voices are called gods. To me this is the origin of gods. I regard them as auditory hallucinations similar to, although not precisely the same as, the voices heard by Joan of Arc or William Blake. Or similar to the voices that modern schizophrenics hear. Similar perhaps to the voices that some of you may have heard. While it is regarded as a very significant symptom in the diagnosis of schizophrenia, auditory hallucinations also occur in some form at some time in about half the general population (Posey & Losch, 1983). I have also corresponded with or interviewed people who are completely normal in function but who suddenly have a period of hearing extensive verbal hallucinations, usually of a religious sort. Verbal hallucinations are common today, but in early civilization I suggest that they were universal.

This mentality in early times, as in the Iliad, is what is called the *bicameral mind* on the metaphier of a bicameral legislature. It simply means that human mentality at this time was in two parts, a decision-making part and a follower part, and neither part was conscious in the sense in which I have described consciousness. And I would like to remind you here of the rather long critique of consciousness with which I began my talk, which

demonstrated that human beings can speak and understand, learn, solve problems, and do much that we do but without being conscious. So could bicameral man. In his everyday life he was a creature of habit, but when some problem arose that needed a new decision or a more complicated solution than habit could provide, that decision stress was sufficient to instigate an auditory hallucination. Because such individuals had no mind-space in which to question or rebel, such voices had to be obeyed.

But why is there such a mentality as a bicameral mind? Let us go back to the beginning of civilization in several sites in the Near East around 9000 B.C. It is concomitant with the beginning of agriculture. The reason the bicameral mind may have existed at this particular time is because of the evolutionary pressures for a new kind of social control to move from small hunter-gatherer groupings to large agriculture-based towns or cities. The bicameral mentality could do this since it enabled a large group to carry around with them the directions of the chief or king as verbal hallucinations, instead of the chieftain having to be present at all times. I think that verbal hallucinations had evolved along with the evolution of language during the Neanderthal era as aids to attention and perseverance in tasks, but then became the way of ruling larger groups.

It can easily be inferred that human beings with such a mentality had to exist in a special kind of society, one rigidly ordered in strict hierarchies with strict expectancies organized into the mind so that hallucinations preserved the social fabric. And such was definitely the case. Bicameral kingdoms were all hierarchical theocracies, with a god, often an idol, at their head from whom hallucinations seemed to come, or, more rarely, with a human being who was divine and whose actual voice was heard in hallucinations.

Such civilizations start in various sites in the Near East and then spread into Egypt, later from Egypt into the Kush in southern Sudan and then into central Africa; while in the other geographical direction, they spread into Anatolia, Crete, Greece; and then into India and southern Russia; and then into the Malay Peninsula, where the ruins of another civilization have just been discovered in northern Thailand; then later into China. A millennium later, a series of civilizations begin in Mesoamerica leading up to the Aztec, and then partly independently and partly by diffusion another series of civilizations in the Andean highlands leading up to the Inca. And wherever we look there is some kind of evidence of what I am calling the bicameral mind. Every ancient historian would agree that all of these early civilizations are thoroughly religious, heavily dependent on gods and idols.

Where writing exists after 3000 B.C., we can see these bicameral civilizations much more clearly. In Mesopotamia the head of state was a wooden statue—wooden so it could be carried about—with jewels in its eyes, perfumed, richly raimented, imbedded in ritual, seated behind a large table (perhaps the origin of our altars) in the *gigunu*, which was a large hall in the bottom of a ziggurat. What we might call the king was really the first steward of this statue god. Cuneiform texts literally describe how people came to the idol-statues, asked them questions, and received directions from them. Just why the minds (or brains) of bicameral people needed such external props as idols for their voices is a question difficult to answer, but I suspect it had to do with the necessary differentiation of one god from another.

I also want to mention that the evidence from written texts, personal idols, cylinder seals, and the construction of personal names suggests that every person had a personal god. In Mesopotamia, it was his *ili*, which in Hebrew is perhaps from the same root as Eli and Elhohim. In Egypt, the personal god which had the same function was called a *ka*, a word

which has been an enigma in Egyptology until now.

In connection with the personal god, it is possible to suggest that a part of our innate bicameral heritage is the modern phenomenon of the 'imaginary' playmate. According to my own research as well as other data (Singer & Singer, 1984), it occurs in at least one-third of modern children between the ages of 2 and 5 years, and is believed now to involve very real verbal hallucinations. In the rare cases where the imaginary playmate lasts beyond the juvenile period, it too grows up with the child and begins telling him or her what to do in times of stress. It is therefore possible that this is how the personal god started in bicameral times, the imaginary playmate growing up with the person in a society of expectancies that constantly encouraged the child to hear voices and to continue to do so.

This, then, is the bicameral mind. I have not had time to discuss the variations between bicameral theocracies, but all were based on strict and stable hierarchies as I have stressed. At least some of such civilizations could be compared to nests of social insects, where instead of the social control being by pheromones from a queen insect, it was by hallucinatory directions from an idol. Everything went like clockwork providing there was no real catastrophe or problem.

The Breakdown of the Bicameral Mind

But such a system is obviously precarious. The huge success of such agricultural bicameral civilizations inevitably leads to overpopulation and complexity, and given a time of social and political instability, bicamerality can break down like a house of cards. Some civilizations broke down frequently, as among the Mayans on this continent. A temple complex and city would be built up, last a few centuries, and then be completely abandoned, presumably because as the society became more and more populous, the voices did not agree anymore. Then after a few centuries as tribal bands, they would somehow get together again and another temple complex would be built up. This is why we find so many of these complexes that show evidence of their people suddenly leaving them.

In Egypt we find that the bicameral mind broke down between what is called the Old Kingdom and the Middle Kingdom, and then again between the Middle and the New Kingdom. The evidence for these dark, chaotic periods is in the hieroglyphic writings after they occurred.

But in Mesopotamia, which was the most stable civilization in the world, there does not seem to have been a breakdown until around 1400 B.C. In the graphics of the period, gods are no longer depicted. In some instances kings beg in front of empty gods' thrones—nothing like that had ever occurred before. Another line of evidence is in the cuneiform literature. There is an epic called the Epic of Tikulti-Ninurta where for the first time in history, gods are spoken of as forsaking human beings. The greatest literature of the period, which is possibly the origin of the Book of Job, is the *Ludlul Bel Nemequi*, the first readable lines of which translate as:

> My god has forsaken me and disappeared,
> My goddess has failed me and keeps at a distance,
> The good angel who walked beside me has departed.

How similar to some of our Hebrew Psalms—Psalm 42, for example.

The reasons for this breakdown are several. The success of bicameral civilizations leads to overpopulation—as I have mentioned, and as is described in texts from the period. There are various huge catastrophes such as the Thera eruption, which is well known and may be the origin of Plato's myth of Atlantis. The ensuing tsunami crushed all the bicameral kingdoms around that part of the Mediterranean. Entire nations were de-

stroyed or dislodged, resulting in large migrations of people invading other countries, looking for 'promised lands,' a place to settle down with their gods again and start another bicameral civilization. One of the reasons that we still have problems in this area of the world, I think, goes right back to this chaotic time.

Another cause is writing itself, because once something is written you can turn away from it and it has no more power over you, in contrast to an auditory hallucination, which you cannot shut out. Writing, particularly as used extensively in Hammurabi's hegemony, weakened the power of the auditory directions. The spread of writing, the complexities of overpopulation, and the chaos of huge migrations as one population invaded others: these are the obvious causes. And in this breakdown, various things started to happen, including I think the beginning of consciousness.

The immediate results of this loss of hallucinated voices giving directions are several and new in world history. The idea of heaven as where the gods have gone; the idea of genii or angels as messengers between heaven and earth; the idea of evil gods such as demons—all are new phenomenon. By 1000 B.C., people in Babylon were walking around draped with amulets and charms, which they wore to protect themselves from a huge variety of demons. Such charms have been found archeologically in the thousands dating from this period.

The Beginning of Consciousness

And then came the development of a new way of making decisions, a kind of proto-consciousness. All significant decisions previously had been on the bicameral mind. But after its breakdown, after the hallucinated voices no longer told people what to do, there seem to have developed various other ways of discerning messages from the gods to make decisions. We call these methods divination. Throwing of lots, the simplest kind; putting oil on water and reading its patterns; dice; the movements of smoke; a priest whispering a prayer into a sacrificial animal, sacrificing it, and then looking at its internal organs to find out what the god intends. All of these were extensively and officially practiced. And then the method of divination that is still around, astrology. It is remarkable to go back and read the cuneiform letters of kings to their astrologers and diviners of around 1000 B.C. (Pfeiffer, 1935). These cruel Assyrian tyrants, who are depicted in their bas-reliefs as grappling with lions and engaging in fierce lion hunts, are, in their letters, meek and frightened people. They don't know what to do. Astrologers tell them, "You cannot move out of your house for five days;" "You must not eat this;" "You should not wear clothes today"—extraordinary strictures that official diviners would interpret as what the gods meant. It is interesting to note that not only has astrology lasted, but it is being followed by more people at present than ever before.

If we now move over Greece just following the period I have been referring to in Mesopotamia, we can trace the bicameral mind as shown in the Linear B Tablets, then going through the Iliad, the Odyssey, through the lyric and elegiac poetry of the next two centuries, as in Sappho and Archilochus, until we get to Solon in 600 B.C. Solon is the first person who seems like us, who talks about the mind in the same way we might. He is the person who said "Know thyself," although sometimes that's given to the Delphic Oracle. How can you know yourself unless you have an analog 'I' narratizing in a mind-space and reminiscing or having episodic memory about what you have been doing and who you are? In Greece, then, one can see in detail the invention and learning of consciousness on the basis of metaphor and analogy (as I have described above) by tracing out through these writings the change in words like *phrenes*, *kardia*, *psyche* (what I have called "precon-

scious hypostacies") from objective referents to mental functions.

The same kind of development has been studied in ancient China by Michael Carr of the University of Otaru. Comparing the four successive parts of the most ancient collection of texts, the *Shijing*, he found the same internalization process for such words as *Xin*, until they become the concept of mind or consciousness in China (Carr, 1983).

Another area of the world during this period where we can see this rise on consciousness is more familiar to most of you. This is among peoples who may have been refugees from the Thera eruption. The word for refugees in Akkad, the ancient language of Babylon, is the word *khabiru*, and this becomes our word Hebrew. The story of the Hebrews, or really one branch of the Hebrews, is told in what we call the Hebrew Testament or the Old Testament.

Those of you who know biblical scholarship will know that the Hebrew Testament is a patchwork of things put together around 600 B.C.—the date keeps coming forward. Using it as evidence is therefore something of a problem. But there are several ways of entering this mosaic of much-edited texts to test the theory, and here I shall mention only one. If we take the purer books, those that are not patchwork but are singly authored and that can be clearly and firmly dated, and compare the oldest with the most recent, such a comparison should reflect the differences in mentality we are referring to. The oldest of them is the Book of Amos, dating from about 800 B.C., and the most recent is the Book of Ecclesiastes, which comes from about 200 B.C.

I suspect that such prophets as Amos were those left-over bicameral or semi-bicameral persons in the conscious era who heard and could relay the voice of Yahweh with convincing authenticity, and who were therefore highly prized in their societies as reaching back to the secure authoritarian ways of the lost bicameral kingdom. Amos is not a wise old man but a shepherd boy brought in from the fields of Tekoa. Probably much of his life has been spent in the fields listening to older shepherds glorying in tales of Yahweh. Asked if he is a prophet, he does not even know what the word means. But periodically he bursts forth with "Thus sayest the Lord," as the King James Bible translates it, and out pours some of the most powerful passages in Jewish history with such an authenticity that he is always surrounded by scribes taking down his words.

Ecclesiastes is just the opposite. He begins by saying that "I saw in my heart that wisdom excelleth folly. . . ." (2:13)—a metaphoric use of 'see.' Spatialized time is something that I have not dwelt upon, but I suggest it is one of the hallmarks of consciousness. We cannot think consciously of time apart from making a space out of it. And this is very much in evidence in Ecclesiastes as, for example, in that oft-quoted but still beautiful hymn to time that begins the third chapter. "For everything there is a season, and a time for every matter under heaven, a time to be born, and a time to die" and so on, with times like spaces for everything. Historically, we could go further into the New Testament and note the even greater importance of conscious internalization and changing behavior from within in contrast to Mosaic law that shaped behavior from without.

Four Ideas

I can sum up what I have said so far as three major ideas about the origin of consciousness. The first concerns the nature of consciousness itself and that it arises from the power of language to make metaphors and analogies. The second idea is the hypothesis of the bicameral mind, an early type of mentality. I think the evidence for its existence is unmistakable. Apart from this idea, there is a problem of explaining the origin of gods, the origin of religious practices in the back corri-

dors of time that is so apparent with a psychological study of history. The bicameral mind offers a possibility to tie it all together and to provide a rationale for it. The third idea is that consciousness followed the bicameral mind. I have placed the date somewhere between 1400 B.C. and 600 B.C. This is a long period and that date may have to be adjusted. But I believe this to be a good approximation.

I would add here that there is a weak form of the theory. It says that consciousness could have begun shortly after the beginning of language or perhaps at certain times and places. After all, people could create metaphors at the beginning of oral language—that is how language grew. Consciousness could have originated in exactly the same way as I have described, and existed for a time in parallel with the bicameral mind. Then the bicameral mind is sloughed off at approximately 1000 B.C. for the reasons I have suggested, leaving consciousness to come into its own. This would provide easy *ad hoc* explanations for highly developed cultures such as Sumer which otherwise are a challenge to bicameral theory. But I do not choose to hold this weak theory because it is almost unfalsifiable. I think we should have a hypothesis that can be disproved by evidence if we are going to call it a scientific hypothesis. Also, the strong theory has a vigorous explanatory power in understanding many historical phenomena of the transition period. Further, I do not see why there would be a need for consciousness alongside of the bicameral mind if the latter made the decisions.

A fourth idea that I shall end with is a neurological model for the bicameral mind. I want to stress, however, that it is not at all a necessary part of the theory I have presented. Since the bicameral mind was so important in history, responsible for civilization, what could have been going on in the brain? The proper strategy in trying to answer such a question is to take the simplest idea and set about to disprove it. If it is disproved, you then go on to something more complicated.

The simplest idea, obvious I think to anyone, would involve the two cerebral hemispheres. Perhaps in ancient peoples—to put it in a popular fashion—the right hemisphere was "talking" to the left, and this was the bicameral mind. Could it be that the reason that speech and language function are usually just in the areas of the left hemisphere in today's people was because the corresponding areas of the right hemisphere once had another function? That is a somewhat questionable way to say it, because there are other reasons for the lateralization of function. But on the other hand, it raises issues that I like. What is an auditory hallucination? Why is it ubiquitous? Why present in civilizations all over the world?

If we assume that back in bicameral times all admonitory information was being processed in some proportion of the billions of neurons of the right hemisphere, and there stored, particularly in what corresponds to Wernicke's area the posterior temporal lobe, until it needed to be accessed, how do such complicated processed admonitions get transferred across the cerebral commissures to the left or dominant hemisphere? And what if, as I have supposed (Jaynes, 1976b), the far, far fewer fibers of the two temporal gyri are the ones involved? And in fact, recent experimental evidence with monkeys indicates that intercommunication of major parts of the temporal lobes is via the anterior commissure (Jouandet, Garey, & Lipp, 1984). The transfer of such information would be more efficiently done if it were put into some kind of code. And what better code is there than human language? So, would it not be interesting if indeed what might correspond to Wernicke's area in the right temporal lobe might be the area that was involved in storing up admonitory information, processing it in such a way that it produced answers to problems and decisions (which is what the bicameral mind is),

and then used the code of language to get it across to the left hemisphere, the hemisphere that speaks, obeys, and manages behavior?

At the time that I was thinking in this primitive fashion, in the early 1960s, there was little interest in the right hemisphere. Even as late as 1964, some leading neuroscientists were saying that the right hemisphere did nothing, suggesting it was like a spare tire. But since then we have seen an explosion of findings about right hemisphere function, leading, I am afraid, to a population that verges on some of the shrill excesses of similar discussions of asymmetrical hemisphere function in the latter part of the 19th century (see Harrington, 1985) and also in the 20th century (see Segalowitz, 1983).

But the main results, even conservatively treated, are generally in agreement with what we might expect to find in the right hemisphere on the basis of the bicameral hypothesis. The most significant such finding is that the right hemisphere is the hemisphere which processes information in a synthetic manner. It is now well known from many studies that the right hemisphere is far superior to the left in fitting together block designs (Kohs Block Design Test), parts of faces, or musical chords (see Bryden, 1982; Segalowitz, 1983). The chief function of the admonitory gods was indeed that of fitting people and functions into these societies. I am suggesting that much of the difference we can observe today between hemisphere function can be seen as echoing the differences between the two sides as echoing the differences between the two sides of the bicameral mind.

In summary, I would like to again repeat these four ideas or modules of the theory I have presented. First is the nature of consciousness and its origin in language, which can be empirically studied in the learning of consciousness in children, as well as in the study of changes of consciousness in recent history. The second idea is the bicameral mind, which can be studied directly in ancient texts and indirectly in modern schizophrenia. Third is the idea that consciousness followed bicamerality, which can be studied in the artifacts and texts of history. And the fourth is that the neurological model for the bicameral mind is related to the two hemispheres. And this can be studied in laterality differences today.

What I have tried to present to you is a long and complicated story. It leaves us with a different view of human nature. It suggests that what civilized us all is a mentality that we no longer have, in which we heard voices called gods. Remnants of this are all around us in our own lives, in our present-day religions and needs for religion, in the hallucinations heard particularly in psychosis, in our search for certainty, in our problems of identity. And we are still in the arduous process of adjusting to our new mentality of consciousness. The final thought I will close with is that all of this that is most human about us, this consciousness, this artificial space we imagine in other people and in ourselves, this living within our reminiscences, plans, and imaginings, all of this is indeed only 3,000 years old.

And that, ladies and gentlemen, is less than 100 generations. And from that I think we can conclude that we are all still very young. Thank you very much.

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